

Claims

- [c1] What is claimed is: 1. A method of consuming Web Services on demand, comprising steps of: parsing WSDL files; automatically generating Web Services client stubs; invoking Web Services with multiple threads; and processing invocation results.
- [c2] 2. The method according to claim 1, wherein the WSDL parsing step causes Web-based forms to be generated concurrently with the client stubs.
- [c3] 3. The method according to claim 1, wherein the Web Services invoking step further comprises steps of: optimally constructing invocation objects; recursively constructing invocation inputs; setting concurrency configurations; and making SOAP calls.
- [c4] 4. The method according to claim 3, wherein the invocation object construction step further comprises the step of automatically constructing invocation objects from said WSDL files.
- [c5] 5. The method according to claim 3, wherein the invocation object construction step further comprises the step of automatically constructing invocation objects from

said client stub.

- [c6] 6. The method according to claim 3, wherein the invocation object construction step further comprises the step of automatically constructing invocation objects from loaded classes.
- [c7] 7. The method according to claim 3, wherein the input construction step further comprises the step of recursively mapping SOAP schema types to data types of the underlying programming language.
- [c8] 8. The method according to claim 3, wherein the concurrency configuration step further comprises the steps of: setting total number of invocation threads; setting initial number of invocation threads; setting time interval for the next thread after initial threads have been spurred; and setting number of repeated invocations per invocation thread.
- [c9] 9. The method according to claim 3, further comprising the step of constructing invocation requests from: said invocation objects; said invocation inputs; and said concurrency configurations.
- [c10] 10. The method according to claim 3, wherein the SOAP call step further comprises the step of simultaneously processing one or more said invocation requests.

- [c11] 11. The method according to claim 10, wherein each invocation request causes one or more invocation threads to be spurred.
- [c12] 12. The method according to claim 1, wherein the Web Services invoking step further comprises the steps of: pausing said invocation threads; stopping said invocation threads; and restarting paused invocation threads.
- [c13] 13. The method according to claim 1, wherein the Web Services invoking step further comprises the step of cloning prior Web Services invocations.
- [c14] 14. The method according to claim 1, further comprising the steps of: measuring SOAP throughput, which indicates the number of completed invocations in a given period of time; measuring active invocation threads; measuring memory usage of the invocation threads; saving an invocation request as the baseline, and comparing performance and load of other invocation requests to the baseline; saving at least two invocation requests as benchmarks, and comparing performance and load among the benchmarks.
- [c15] 15. The method according to claim 1, further comprising the step of charging end users with a pay-as-you-go finance schedule.

- [c16] 16. The method according to claim 1, further comprising the step of charging end users with a prepaid finance schedule.
- [c17] 17. The method according to claim 1, wherein the result processing step further comprises the step of presenting the invocation result with a set of predefined templates.
- [c18] 18. The method according to claim 1, wherein the result processing step further comprises the step of processing attachments which are received along with the invocation results.
- [c19] 19. A system for consuming Web Services on demand, comprising means for: parsing WSDL files; automatically generating Web Services client stubs; invoking Web Services with multiple threads; and processing invocation results.
- [c20] 20. The system according to claim 19, further comprising means for processing instantaneous and spontaneous invocation requests.
- [c21] 21. The system according to claim 19, further comprising means for dynamically configuring and reconfiguring the invocation requests.
- [c22] 22. The system according to claim 19, wherein the

means for invoking Web Services further comprises means for charging end users with a pay-as-you-go finance schedule.

[c23] 23. The system according to claim 19, wherein the means for invoking Web Services further comprises means for charging end users with a prepaid finance schedule.

[c24] 26. The system according to claim 19, further comprising means for instantly making Web Services accessible via the Web.

[c25] 25. The system according to claim 19, further comprising means for: performance testing Web Services; load testing Web Services; and benchmark testing Web Services.

[c26] 26. A computer program product for consuming Web Services on demand, the computer program product embodied on one or more computer-readable media and comprising computer-readable program code means for: parsing WSDL files; automatically generating Web Services client stubs; invoking Web Services with multiple threads; and processing invocation results.

[c27] 27. The computer program product according to claim 26, wherein the means for parsing WSDL files causes

HTML forms to be generated concurrently with Java client stubs.

[c28] 28. The computer program product according to claim 26, wherein the means for invoking Web Services further comprises computer-readable program code means for: optimally constructing invocation objects; recursively constructing invocation inputs; setting concurrency configurations; and making SOAP calls.

[c29] 29. The computer program product according to claim 28, wherein the means for constructing invocation objects further comprises computer-readable program code means for automatically constructing invocation objects from said WSDL files.

[c30] 30. The computer program product according to claim 28, wherein the means for constructing invocation objects further comprises computer-readable program code means for automatically constructing invocation objects from said client stubs.

[c31] 31. The computer program product according to claim 28, wherein the means for constructing invocation objects further comprises computer-readable program code means for automatically constructing invocation objects from loaded classes.

- [c32] 32. The computer program product according to claim 28, wherein the means for constructing inputs further comprises computer-readable program code means for recursively mapping SOAP schema types to Java types.
- [c33] 33. The computer program product according to claim 28, wherein the means for concurrency configurations further comprises computer-readable program code means for: setting total number of invocation threads; setting initial number of invocation threads; setting time interval for the next thread after initial threads have been spurred; and setting number of repeated invocations per invocation thread.
- [c34] 34. The computer program product according to claim 28, further comprising computer-readable program code means for constructing invocation requests from: said invocation objects; said invocation inputs; and said concurrency configurations.
- [c35] 35. The computer program product according to claim 28, wherein the means for making SOAP calls further comprises computer-readable program code means for simultaneously processing one or more said invocation requests.
- [c36] 36. The computer program product according to claim

35, wherein each invocation request causes one or more invocation threads to be spurred.

[c37] 37. The computer program product according to claim 26, wherein the means for invoking Web Services further comprises computer-readable program code means for: pausing said invocation threads; stopping said invocation threads; and restarting paused invocation threads.

[c38] 38. The computer program product according to claim 26, wherein the means for invoking Web Services further comprises computer-readable program code means for cloning prior Web Services invocations.

[c39] 39. The computer program product according to claim 26, further comprising computer-readable program code means for: measuring SOAP throughput, which indicates the number of completed invocations in a given period of time; measuring active invocation threads; measuring memory usage of the invocation threads; saving an invocation request as the baseline, and comparing performance and load of other invocation requests to the baseline; saving at least two invocation requests as benchmarks, and comparing performance and load among the benchmarks.

[c40] 40. The computer program product according to claim

26, further comprising computer-readable program code means for: measuring minimum response time for Web Services invocations; measuring maximum response time for Web Services invocations; measuring mean response time for Web Services invocations; measuring percentage success for Web Services invocations; measuring percentage fail for Web Services invocations; measuring percentage unfinished for Web Services invocations; measuring elapsed time for Web Services invocations; and estimating time to completion for Web Services invocations.

[c41] 41. The computer program product according to claim 26, wherein the means for invoking Web Services further comprises computer-readable program code means for charging end users with a pay-as-you-go finance schedule.

[c42] 42. The computer program product according to claim 26, wherein the means for invoking Web Services further comprises computer-readable program code means for charging end users with a prepaid finance schedule.

[c43] 43. The computer program product according to claim 26, wherein the means for processing invocation results further comprises computer-readable program code means for presenting the invocation result as a table of

name value pairs.

- [c44] 44. The computer program product according to claim 26, wherein the means for processing invocation results further comprises computer-readable program code means for processing attachments which are received along with the invocation results.
- [c45] 45. The computer program product according to claim 26, further comprising computer-readable program code means for processing overloaded methods.
- [c46] 46. The computer program product according to claim 26, further comprising computer-readable program code means for: intercepting SOAP request messages; intercepting SOAP response messages; transforming SOAP request messages; and redirecting SOAP request messages.
- [c47] 47. The computer program product according to claim 25, wherein the means for generating HTML forms further comprises computer-readable program code means for dynamically reconfiguring the list of operations to be invoked.
- [c48] 48. The computer program product according to claim 25, further comprises computer-readable program code means for ignoring duplicate submissions of the gener-

ated HTML forms.